the exposure to stray air currents and variations in the cycle of operation introduce complex variables which are difficult to consider. When the cycle is fixed and proper allowance made for the exposure, these losses may be reduced to mathematical analysis.

The frictional resistance in the checkers and flues may be approximated by the formula of Mojarow. This formula is

$$SL$$

in which 7 = the frictional resistance expressed in inches of water or, if the metric system is used, millimeters of water or kilograms per square meter;

m = coefficient of friction, as determined by Mojarow = 0.003076 for English units or 0.016 for metric units. This coefficient was determined by observations on a Cowper hot-blast stove. Murge fixed a coefficient for mine galleries of one-third these values — namely, 0.001026 for English and 0.0053 for metric units;

S = perimeter of passage or summation of the perimeters of passages through which the gases flow;

L — length of the passage or flue;

SL = total surface of passage or flue in contact with flowing gases;

co = cross-sectional area of the passage; or, where this varies, the mean sectional area; or, where the stream of gas does not fill the flue, the area of the flowing stream;

v_t = average velocity of flow per second at $t°$;

p* = specific weight of a unit volume of gas at $t°$;

t = average temperature of the flowing gas in the section examined.